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STATE OF ALASKA

William A. Egan, Governor

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FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-6

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME
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INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-6, "Sport Fish Investigations of Alaska."

The project during this report period is composed of 23 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. Of these, eight jobs are designed to pursue the cataloging and inventory of the numerous State waters in an attempt to index the potential recreational fisheries. Four jobs are designed for collection of specific sport fisheries creel census while the remainder of the jobs are more specific in nature. These include independent studies on king salmon, silver salmon, grayling, Dolly Varden, a statewide access evaluation program and an egg take program.

A report concerning the residual effects of toxaphene accumulates the findings of a three-year study. The report presented here terminates this segment and is a final report. The information gathered from the combined studies will provide the necessary background data for a better understanding of local management problems and will assist in the development of future investigational studies.

The subject matter contained within these reports is often fragmentary in nature. The findings may not be conclusive and the interpretations contained therein are subject to re-evaluation as the work progresses.

Volume 6 Report No. 1-A

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.

Project No.: F-5-R-6 Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Upper Southeast Alaska.

Job No.: 1-A

Period Covered: July 1, 1964 to March 1, 1965.

ABSTRACT

Inventory and cataloging of the waters in Upper Southeast Alaska was undertaken in 1961 and continued through 1963 (Volumes 3-4, Report No. 3-A, Alaska Department of Fish and Game Dingell-Johnson Annual Report of Progress, 1961-1962; 1962-1963). This report is a continuation of these prior studies. The area covered is Admiralty Island, Chichagof Island and Baranof Island.

Standard survey techniques were used in evaluating waters readily available, waters heavily utilized by sport fishermen and waters possessing potential for producing a sport fishery through application of management techniques.

Twenty-three lakes and nine streams were investigated during the period of this report. Three lakes were found barren of fish and are recommended for stocking of game fish. One lake was overpopulated with fish, resulting in stunting of the entire population and is recommended for population control measures thorugh partial eradication by chemical poisoning. One lake was investigated to evaluate the effects of a proposed hydroelectric development project on the sport fish resources.

Recommendations are made for the experimental introduction of kokanee salmon, Onchorhynchus nerka (Walbaum), and Arctic grayling, Thymallus arcticus (Cope); the initiation of Dolly Varden char, Salvelinus malma (Walbaum), egg take studies; and the intensive management of one lake through chemical rehabilitation and restocking.

RECOMMENDATIONS

Barren Waters

The following lakes were surveyed and found to be barren of fish and are recommended for stocking with the following species of game fish:

Name of Lake	Location	Recommended Sport Fish Species
Cold Storage Lake	Baranof Island	Grayling
Rosenberg Lake	Baranof Island	Grayling
Un-Named Lake	Baranof Island	Rainbow Trout

Lake Rehabilitation

Swan Lake, Sitka area, will be altered physically and ecologically following an urban renewal development program. The present population of sport fishes will be unable to reproduce and/or survive in the marginal habitat conditions created. It is recommended that chemical eradication of all fish be accomplished following the proposed physical change and the lake stocked with Arctic grayling.

Population Control

Thimbleberry Lake was investigated and found to contain an overabundant population of eastern brook trout, Salvelinus fontinalis (Mitchill), resulting in the entire population becoming stunted. To improve the growth rate and promote larger sized fish to the anglers creel, it is recommended that a program of population control through partial poisoning be accomplished.

Sport Fish Egg Take Source

Field investigation and past studies by the U. S. Fish and Wildlife Service and the Alaska Department of Fish and Game showed that the South Fork, Katlian River, Baranof Island, supports an extensive population of sea-run Dolly Varden char. Further, temporary housing and other facilities for trapping and holding fish are available. It is recommended that sea-run Dolly Varden char egg take studies be initiated on the South Fork, Katlian River, in the late summer of 1965.

Introduction of Forage Fish

Population sampling of large, oligotrophic lakes, in the course of the present investigation indicated the desirability of experimentally introducing a plankton feeding fish species for forage by the trout populations. In numerous lakes, the plankton biomass is not being fully utilized. Exploitation of this unused food niche by a forage species of fish would provide an additional source of food for the trout populations existing in these waters. Thayer Lake, Admiralty Island, is recommended to receive transplants of adult kokanee salmon. The progeny of this transplant will be used to test the usefulness of this species as a forage fish for cutthroat trout, Salmo clarki (Richardson).

It is further recommended that the cataloging and inventory studies be continued through the 1965-1966 season with increased emphasis on determining the geographical distribution of steelhead trout, Salmo gairderni (Richardson), and cutthroat trout and development of suitable egg taking sites for these species.

OBJECTIVES

To assess the environmental characteristics of the existing and potential fishery waters of the job area and, where practicable, obtain estimates of existing or potential angler use and sport fish harvest.

To evaluate application of fishery restoration measures and availability of sport fish egg take sources.

To assist as required in the investigation of public access status to the area's fishing waters.

To evaluate multiple water use, development projects (public and private) and their effects on the area's streams and lakes for the proper protection of the sport fish resources.

TECHNIQUES USED

Background data and information from prior studies conducted by the Alaska Department of Fish and Game and other agencies were used in determining the course and extent of the surveys.

Species distribution and estimates of their comparative abundance were determined by hook and line sampling and the use of 125-foot variable mesh gill nets.

Water chemistry analysis was accomplished through the use of a Hach electrical colorimeter.

Temperature stratifications were determined with an electrical thermometer.

Lake bottom profiles were obtained by a portable recording fathometer with the transducer attached to an airplane float.

Angler utilization was estimated from interviews with local residents, U. S. Forest Service records and personal observations.

FINDINGS

The area covered during the period of the present investigation includes Chichagof Island, Admiralty Island and Baranof Island.

TABLE 1. - Waters Investigated During the 1964-1965 Field Season

Name	Location	Game Species Present *	Angler Utilization
Hasselborg Lake	Admiralty Island	Ct, DV, Kok	Moderate
Thayer Lake	Admiralty Island	Dt, DV	Moderate
Goulding Lake #1	Chichagof Island	Ct, DV	Very Light
Goulding Lake #2	Chichagof Island	Ct, DV	None
Goulding Lake #3	Chichagof Island	Ct, DV	None
Goulding Lake #4	Chichagof Island	Ct, DV	None
Avoss Lake	Baranof Island	Rb	Light
Blue Lake	Baranof Island	Rb	Mod.-Heavy
Cold Stg. Lake	Baranof Island	No Fish	-
Davidof Lake	Baranof Island	Rb	Light
Emerald Lake	Baranof Island	No Fish	-
Gen-Gen Lake	Baranof Island	DV	None
Green Lake	Baranof Island	BT	Light
Heart Lake	Baranof Island	BT	Light
Medvedjie Lake	Baranof Island	DV	Very Light
Plotnikof Lake	Baranof Island	Rb, DV, SS	Light
Rezanof Lake	Baranof Island	Rb	Light
Rosenburg Lake	Baranof Island	No Fish	-
Salmon Lake	Baranof Island	Ct, Sh, Rb, DV, SS, PS, DS, RS	Moderate
Swan Lake	Baranof Island	Ct, DV	Very Light
Takatz Lake	Baranof Island	No Fish	-
Thimbleberry L.	Baranof Island	BT	Light
Un-Named Lake	Baranof Island	No Fish	-
Black River	Chichagof Island	SS, DV, Ct, DS, PS	None
Big Branch Cr.	Baranof Island	SS, DV, PS DS	None
Katlian River	Baranof Island	SS, DV, Ct, DS, PS	Light
Nakwasina River	Baranof Island	SS, DV, Ct, DS, PS	Light
Noxon Creek	Baranof Island	SS, DV, Ct, DS, PS	None
Kizhuchia Creek	Baranof Island	SS, DV, PS, DS	None
Port Banks Creek	Baranof Island	SS, DV, SH	Moderate
Salmon Creek	Baranof Island	SS, DV, Ct, Rb, SH, PS, DS	Moderate
Starrigavin Cr.	Baranof Island	SS, DV, PS, DS	Moderate

* Ct - Cutthroat trout
Rb - Rainbow trout
SH - Steelhead trout
DV - Dolly Varden char
BT - Eastern brook trout
SS - Silver or coho salmon
DS - Dog or chum salmon
PS - Pink or humpbacked salmon
Kok - Kokanee salmon
RS - Red or sockeye salmon

TABLE 2. - Test Netting Summaries, 1964

Name	Number of Fish	Species	Length Range (inches)	Mean Length	Frequency	Percent Composition
Avoss Lake	11	Rb	7.7-18.0	12.0	.19	100
Blue Lake	62	Rb	2.0-12.2	5.5	.41	100
Davidof Lake	12	Rb	6.1-20.0	11.6	.20	100
Gen-Gen Lake	7	DV	4.3-10.1	6.9	.09	100
Goulding Lakes	81	Ct	7.1-13.8	10.2	.59	89
	12	DV	5.9-10.6	8.4	.09	11
Green Lake	15	BT	6.7-13.2	9.3	.35	100
Hasselborg Lake	48	Ct	7.4-20.0	10.7	.47	61
	31	DV	7.6-12.4	8.1	.07	39
Heart Lake	20	BT	7.7- 9.0	8.5	.33	100
Medvedjie Lake	81	DB	6.1-13.1	8.4	.84	100
Plotnikof Lake	7	Rb	7.5-17.3	11.9	.20	87.5
	1	DV	7.3	-	.03	12.5
Rezanof Lake	7	Rb	7.2-17.5	13.5	.20	100
Thimbleberry Lake	35	BT	6.3- 9.1	6.6	.36	100
Thayer Lake	106	Ct	6.0-11.3	8.9	1.09	66
	55	DV	5.8-11.5	7.3	.56	34

Twenty-three lakes and nine streams were investigated (Table 1). Test netting summaries are presented in Table 2.

Three lakes were found barren of fish and judged suitable to sustain game fish and produce a sport fishery under management (Table 3).

TABLE 3. - Barren Lakes and Recommended Game Fish Species to be Stocked

Name of Lake	Location	Recommended Game Fish Species
Cold Storage Lake	Baranof Island	Grayling
Rosenberg Lake	Baranof Island	Grayling
Un-Named Lake	Baranof Island	Rainbow Trout

Admiralty Island

Thayer Lake

Thayer Lake is an oligotrophic lake of approximately 3,155 surface acres, situated at an elevation of 368 feet and is located centrally on Admiralty Island. Native fish species include cutthroat trout, Dolly Varden char and threespine stickleback, Gasterosteus aculeatus (Linnaeus).

Limnological and biological characteristics of Thayer Lake are typified by a windswept, rocky shoreline with occasional small, sandy beaches; relatively cold water temperatures; a thermocline forming in middle and late August; and narrow, steeply slanting shoal areas that fall almost vertically. Food production is severely limited due to the lack of abundant shoal area, cold water temperatures during the greater part of the summer growing season and a watershed lacking in basic nutrient minerals. The lake water is very soft, lacking almost entirely in soluble bicarbonates and dissolved solids. The hydrogen-ion concentrations is almost neutral with a pH reading on August 27, 1964, of 6.9.

Sport fishing for the indigenous cutthroat trout is excellent. Large cutthroat, over 18 inches, are notably absent. Dolly Varden char, although abundant, enter the sport fishery sporadically and in small numbers.

Population sampling with monofilament and nylon experimental gill nets failed to take any large cutthroat trout (Table 2).

A commercial facility has been present on Thayer Lake since 1947. Catch records maintained by the lodge owner and operator over the years reveal a high rate of angling success, but no large trout are taken by anglers. From an analysis of the available data, it is assumed that a climax population of cutthroat trout exists in Thayer Lake and the absence of fish over 18 inches is due to an inadequate food supply.

The system appears suitable for an experimental stocking of kokanee salmon to serve as a forage fish for the cutthroat trout in order to produce larger fish to the angler's creel. Kokanee salmon are predominantly plankton feeders and would utilize a food niche presently unoccupied.

Baranof Island

Blue Lake - Takatz Lake

Blue Lake and Takatz Lake were test netted in cooperation with the Branch of River Basin Studies, U. S. Fish and Wildlife Service.

Blue Lake is a developed hydroelectric site and Takatz Lake is a proposed hydroelectric site. Separate comprehensive reports on the sport fishery in Blue Lake and the impact of power development on the sport fishery of Takatz Lake are on file in the Sitka and Juneau Sport Fish Offices of the Alaska Department of Fish and Game and the office of the Branch of River Basin Studies, U. S. Fish and Wildlife Service, in Juneau.

Swan Lake

The City of Sitka will, under an urban renewal program, lower the water level of Swan Lake approximately three feet from its present level and construct a culvert from the immediate outlet of Swan Lake beyond the mean, low tide level to carry the lake discharge.

The maximum depth of Swan Lake is 11 feet; the new proposed maximum depth would be eight feet; the culvert would be 1,150 feet long.

At the present water level, marginal conditions exist for trout during the winter period. Dissolved oxygen analysis on January 6, 1965 showed 5.0 ppm oxygen at the 5-foot level and 2.3 ppm oxygen at the maximum depth of 11 feet. The ice depth was nine inches and the snow cover was eight inches. At the time of sampling, the ice cover had been on Swan Lake five weeks. An enclosed culvert of 1,150 feet is assumed to prevent entry of anadromous species of fish into Swan Lake and will remove the primary spawning area for trout.

Because of the central location of Swan Lake in the City of Sitka, efforts to manage and establish a sport fishery are deemed necessary. Lake rehabilitation through chemical eradication of the existing fish species and restocking with Arctic grayling, a species more tolerant to low levels of dissolved oxygen than salmonids, would produce a highly desirable sport fishery within two growing seasons.

Thimbleberry Lake

Population sampling of Thimbleberry Lake with gill nets and angler creel checks indicate the lake to be overpopulated with eastern brook trout, Salvelinus fontinalis (Mitchill). The result has been a general stunting of the entire population (Table 2). Sport fishing on Thimbleberry Lake has declined due to the small size of the fish and general dissatisfaction is expressed by local fishermen.

Removal of a portion of the brook trout population through chemical means would allow an increase in growth rates by greater availability of food to the remaining portion of the population and result in larger fish in the angler's creel.

Dolly Varden Egg Take Source

South Fork, Katlian River, located 10 miles north of downtown Sitka, was investigated as a possible source of obtaining sea-run Dolly Varden eggs. Five criteria were used to select a site - a stream system lacking a lake; a large population of Dolly Varden; available housing facilities for temporary personnel; noninterference with an established sport fishery; and accessibility by small skiff from Sitka. The South Fork, Katlian River, fulfills all of the criteria. No lake system is present in the South Fork, Katlian drainage; past records of the U. S. Fish and Wildlife Service, the Alaska Department of Fish and Game and field observations in 1964 indicate extensive numbers of Dolly Varden using the system; a cabin is available for housing personnel; sport fishing on the South Fork, Katlian, is minor and the site area can be reached by a short skiff run of five miles from the terminus of the Sitka highway system at Starrigavin Bay.

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Date: March 31, 1965

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